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I also certify that the attached copy of the request for grant of a Patent (Form 1/77) bears an amendment, effected by this office, following a request by the applicant and agreed to by the Comptroller-General.

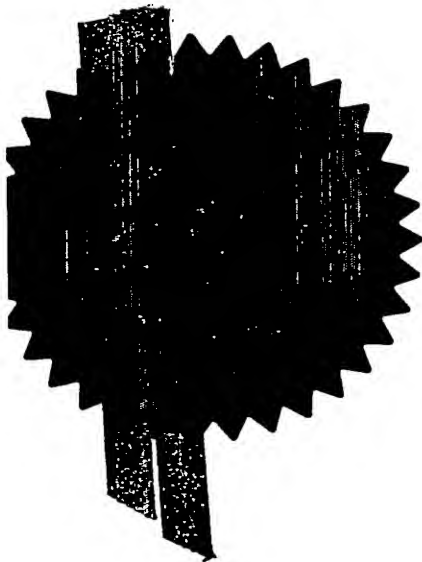
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Patent Act 1977
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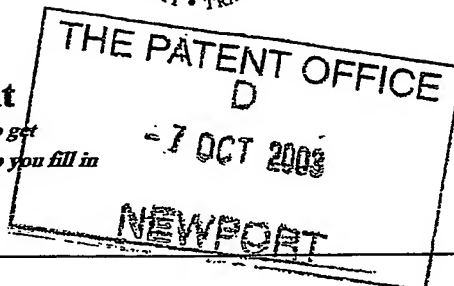
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P01/7700 0.00-0323390.5

The Patent Office

Cardiff Road
Newport
South Wales
NP10 8QQ

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)



1. Your reference

2. Patent application number

(The Patent Office will fill this part in)

0323390.5

3. Full name, address and postcode of the or of each applicant (underline all surnames)

MR QUINTIN ANTHONY MURFIN

ROSEWOOD

LA LONGUE RUE

ST MARTIN

JERSEY JE3 6ED

GREAT BRITAIN

8727760001

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

ENVIRONMENTAL WATER DISPOSAL SYSTEM

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

THE GLEN
BEACH ROAD WEST
FORTISHEAD
BRISTOL
BS 20 9HX

Patents ADP number (if you know it)

8727778001

6. Priority: Complete this section if you are declaring priority from one or more earlier patent applications, filed in the last 12 months.

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. Divisionals, etc: Complete this section only if this application is a divisional application or resulted from an entitlement dispute (see note f)

Number of earlier UK application

Date of filing
(day / month / year)

8. Is a Patents Form 7/77 (Statement of inventorship and of right to grant of a patent) required in support of this request?

NO

Answer YES if:

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

Otherwise answer NO (See note d)

Patents Form 1/77

9. Accompanying documents: A patent application must include a description of the invention. Not counting duplicates, please enter the number of pages of each item accompanying this form:

Continuation sheets of this form 0

Description 2

Claim(s) 1

Abstract 1

Drawing(s) 1 & 1

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10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for a preliminary examination and search (Patents Form 9/77)

Request for a substantive examination (Patents Form 10/77)

Any other documents (please specify)

11. I/We request the grant of a patent on the basis of this application.

Signature(s) *R.A. Murgin*

Date 5/10/2003

12. Name, daytime telephone number and e-mail address, if any, of person to contact in the United Kingdom

RICHARD CLARK
01275 843904

Warning

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Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 08459 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
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- Once you have filled in the form you must remember to sign and date it.
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ENVIRONMENTAL WATER DISPOSAL SYSTEM

The invention relates to a system of capture, storage and disposal of water that lands on an external unpaved or paved surface (pedestrian, vehicular or industrial) from rainfall or human activity containing pollution, which avoids direct pollution to the surrounding aquatic environment.

Commonly the disposal of polluted water arising from rainfall onto external surfaces that may have soluble pollutant depositions on the surface, or human activities that generate quantities of polluted water, require disposal to the surrounding environment, which will usually have an aquatic element (e.g. watercourses, groundwater, sea) creating a risk of pollution to the surrounding environment.

An object of this invention is to negate the need for disposal of water with an element of pollutant content to the surrounding aquatic environment.

Water (and possibly liquids including dissolved substances and suspended solids) contacting the surface of the structure is directed to the underlying structure by infiltration or by a drainage pathway. The water (and any other liquids) are stored within the underlying structure in the voids of the structure and is retained by an underlying impermeable membrane. Disposal of water is achieved by lifting the water (and any liquids) and applying it (continuously or intermittently) to the unpaved or paved surface of the structure allowing weather generated evaporation to occur unaided, or aided by evaporation increasing processes.

Accordingly, this invention provides a method of disposal of some water by evaporation to the atmosphere, leaving non-volatile pollutants contained within storage which may be degraded by any filter bed characteristics of the storage process, and disposed of by periodic emptying of concentrated leachate (ideally at times of low storage volume) and by final disposal of the structure at the end of its life.

The process is particularly applicable to industrial pavements that receive a degree of chemical deposition and are not continuously in use (allowing intermittent surface wetting without nuisance). Where these are in areas of sensitive water quality receiving waters, and where increased runoff from a site due to development is an issue, the benefits are greatest.

Two examples of the application of the system are illustrated in figures 1 and 2 that show generic vertical sections through structures to generate the system. Plan areas would be determined by the human activity required on the surface.

FIGURE 1 shows a Pearmeable Activity Surface to the system.

FIGURE 2 shows a Paved (e.g pavement quality concrete) Activity Surface structure.

In Figure 1, The Permeable Activity Surface (1), which allows rainwater and any activity water (and possibly liquids including dissolved substances and suspended solids) to drain into the storage cell below, could be unpaved (e.g. unbound macadam) or permeable paving (e.g. permeable block paving).

A Voided Structural Filling (2), which could be an open graded stone with a high void ratio or a synthetic voided structure, creates a storage cell for the infiltrating water. The Impermeable Liner (3) extends up to the surface and prevents the passage of the water into the adjoining soil or other supporting element. The Water Level (4) should be below the surface to prevent overflow in service.

Water (and any other liquids) in storage is lifted by a Water Lifting Device (5) (e.g. a pump) and feeds a Water Application Device (6) (e.g. irrigation sprays) to spread the lifted water uniformly over the entire surface without spreading the water beyond the area. The rate of application should closely match the evaporation rate prevailing on the surface due to the Open Air Weather Environment (7) factors (e.g. surface solar heat gain, wind generated evaporation, surface heat sink, and precipitation) and any human enhancement of the surface evaporation (e.g. heating the surface). Any water (and any other liquid) that does not evaporate recycles back to storage by the path described above. The effect of evaporation of the stored water is to minimise the amount of stored water that needs to be disposed of from storage leaving non-volatile pollutants (which may be degraded by any aeration and any filter bed characteristic of the storage process) to be disposed of by periodic emptying of concentrated leachate (ideally at times of low water storage volume) and by final disposal or the structure at the end of its life.

The design depth of the Voided Structural Filling (2) should be determined to ensure that maximum amount of water, and any other liquid, stored during annual cycles is accommodated and hence ensure that the Water Level (4) remains below the surface to prevent overflow in service. Varying evaporation can be determined from metrological data for the location and any human enhancements added. The balance of evaporation against inflow of rainfall and activity generated water (and any other liquid) can then be calculated over time and maximum storage required determined for the design weather return period selected by risk analysis with allowances for any storage capacity loss due to biofilm and deposition of suspended solids.

Figure 2 shows a system with an identical process, however the surface is an Impermeable Pavement (8) laid to drain to a Drainage Pathway (9) allowing water from the surface to enter the Voided Structural Filling (2).

Precautions against water borne diseases may be required where persons frequent the surface.

CLAIMS

1. A system of capture, storage and disposal of water that falls on an external unpaved or paved surface (pedestrian, vehicular or industrial) from rainfall (which may be polluted by contact with the surface), or human activity generated liquid containing pollution, which utilises evaporation and avoids direct pollution to the surrounding aquatic environment by virtue of there being no outfall to the system.
2. A system as claimed in Claim 1 allowing flow of water and other liquids (including dissolved and suspended substances) from the surface to an underlying storage structure by infiltration or by a drainage pathway.
3. A system as claimed in Claims 1 and 2 where water (and any other liquid) is stored within the underlying structure in the voids of the structure retained by an underlying impermeable membrane.
4. A system as claimed in Claims 1,2 and 3 where disposal of water is achieved by lifting the water (and any other liquid) from storage and applying it to the unpaved or paved surface of the structure allowing weather generated evaporation to occur unaided, or aided by evaporation increasing processes, with any water (and any other liquid) that does not evaporate recycling back to storage by the route set out in Claim 2.
5. A system as claimed in Claims 1,2,3 and 4 that provides a method of disposal of some of the water by evaporation to the atmosphere, leaving pollutants contained within storage (which may be degraded by any aeration and any filter bed characteristic of the storage process) to be disposed of by periodic emptying of concentrated leachate and by final disposal of the structure at the end of its life.
6. An Environmental Water Disposal System as herein described above and illustrated in the accompanying drawings.

ABSTRACT

ENVIRONMENTAL WATER DISPOSAL SYSTEM

A surface water disposal system without an outfall. Liquids falling on the Permeable Activity Surface (1) or Impermeable Pavement (8) of the structure is directed to the underlying structure by infiltration or by a Drainage Pathway (9). The Liquid is stored within the underlying Voided Structural Filling (2), and is retained by an underlying Impermeable Liner (3). Disposal of water is achieved by using a Water Lifting Device (5) to feed a Water Application Device (6) that applies water to the surface allowing Open Air Weather Environment (7) generated evaporation to occur unaided, or aided. Disposal of some of the water by evaporation to the atmosphere leaves pollutants contained within storage that require disposal by periodic emptying of concentrated leachate and by final disposal of the structure at the end of its life.

(Figures 1 and 2 to accompany the extract)

1/1

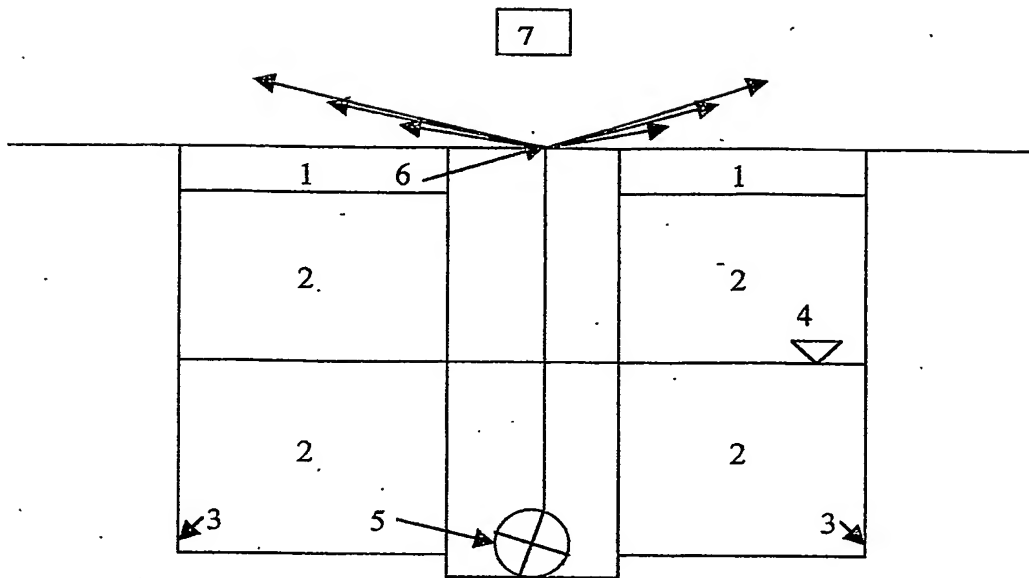


Figure 1

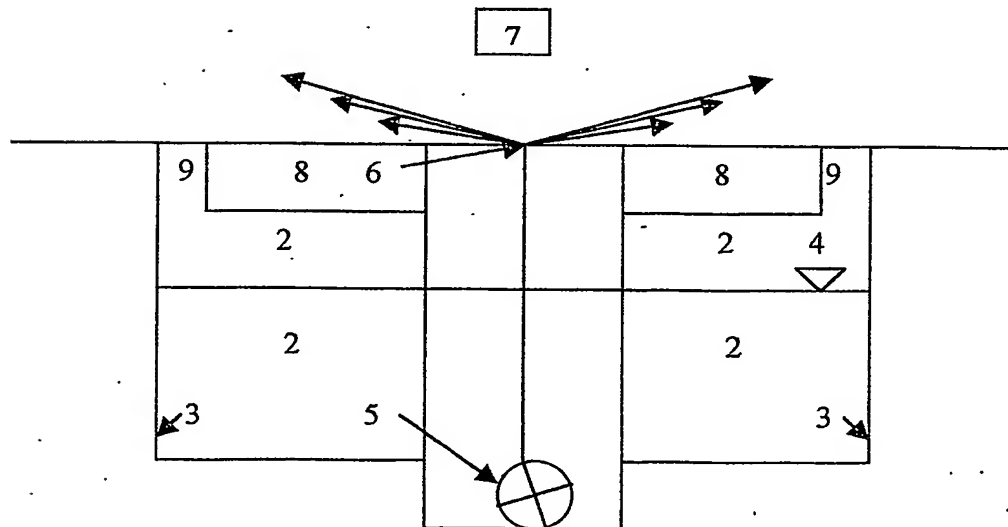


Figure 2